

# Experimental Validation of the Piezoelectric Triple Hybrid Actuation System (TriHYBAS)

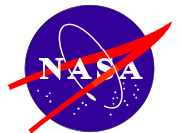
**Tian-Bing Xu<sup>1</sup>, Xiaoning Jiang<sup>2</sup>, Ji Su<sup>3</sup>**

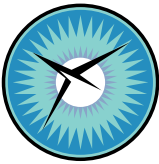
1. National Institute of Aerospace, Hampton, VA
2. TRS Technologies, Inc., State College, PA
3. NASA Langley Research Center, Hampton, VA

**May 14, 2008**

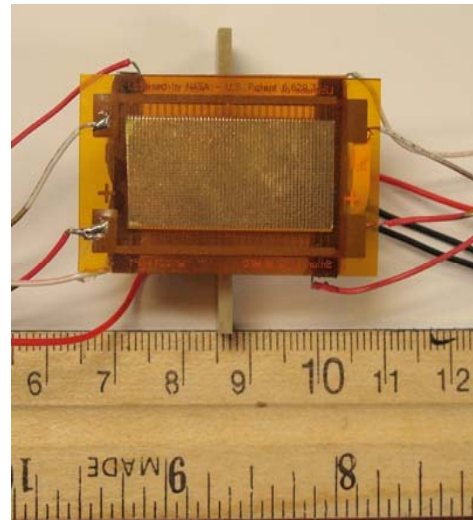
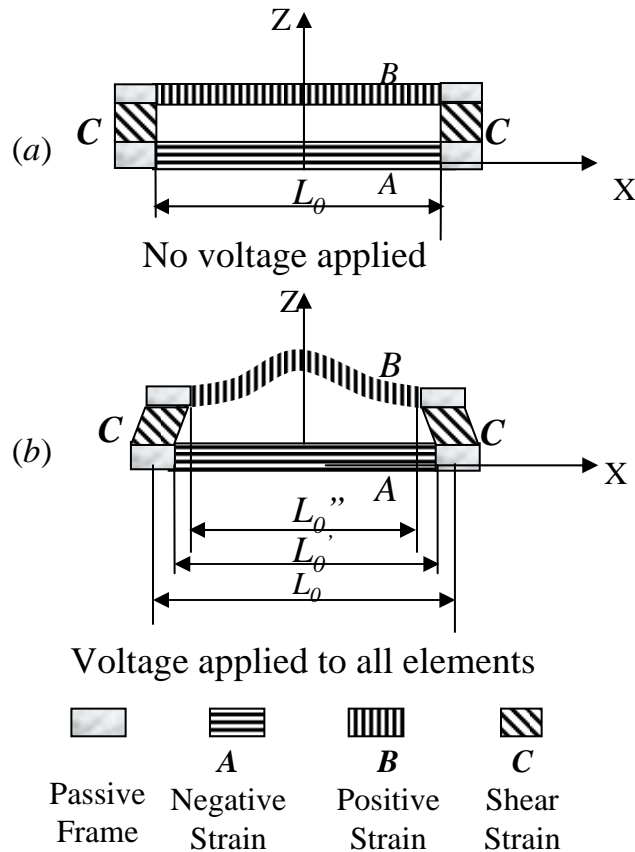
**2008 Navy Workshop on Acoustic transduction Materials and devices**

**State College, PA**

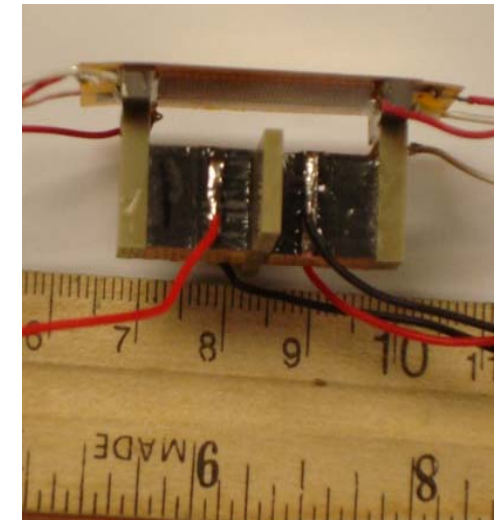




# Piezoelectric Triple Hybrid Actuation System (TriHYBAS)

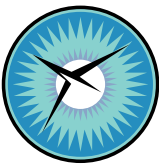


(a)

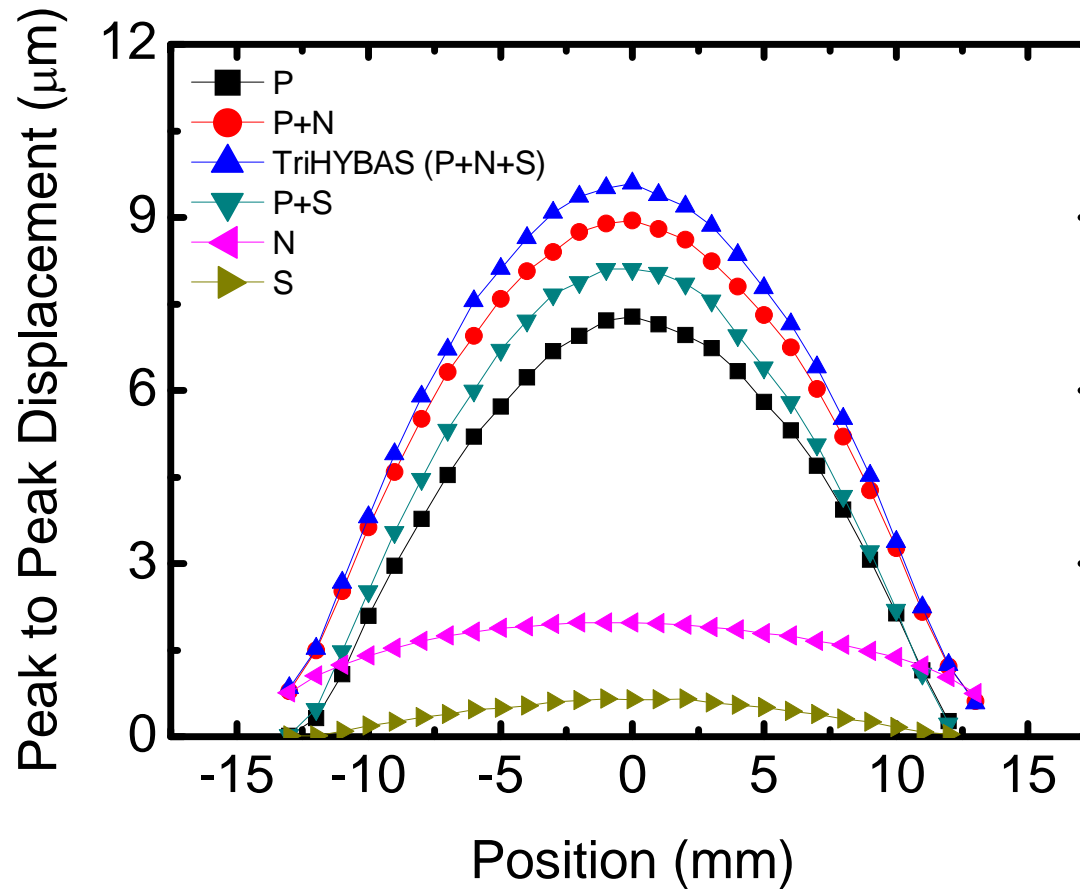


(b)

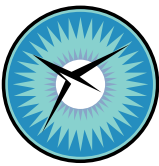
- Ji Su, Tian-Bing Xu, Shujun, Zhang, Thomas Shrouff, and QiMing Zhang, "An Electroactive Polymer-ceramic Hybrid Actuator Systems for Enhanced Electromechanical Performance," **Applied Physics Letters** 85(6), pp. 1045-1047, 2004.
- Tian-Bing Xu, Xiaoning Jiang, and Ji Su, "High Performance Piezoelectric Triple Hybrid Actuation System (TriHYBAS)," NASA Case # LAR 17618-1



## Displacement Profile of TriHYBAS



Applied Unipolar Voltage: 300 V DC bias and 200 Vrms AC at 1 Hz



## Displacement Vs. Applied Voltage

Displacement at center of TriHYBAS

Displacement in length direction  
for positive and negative components

